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CONSERVATION OF MATERIAL RESOURCES
BY INSTITUTES OF USSR AUTOMOBILE INDUSTRY

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[Comment: The editors of the periodical Za Ekonomiyu Materialov
 (For the Conservation of Materials) sent a request to numerous scien-
 tific research institutes for information on the activity of these
 institutes in the field of the conservation of material resources in
 1953. This report gives extracts from one of the answers to this
 request. The author is in a position to present information on sev-
 eral major institutes of the automobile industry.]

Scientific research organizations, despite their essential role in complete
 and rational utilization of industrial resources, hitherto have not been suf-
 ficiently active in solving the problems of the conservation of materials, and
 their activity in this field requires decisive amendment.

To a certain extent, this statement applies also to the scientific re-
 search organizations of the Ministry of the Automobile and Tractor Industry.
 However, these organizations have performed a number of works concerned with
 the economical utilization of material resources in the national economy. Re-
 cently, leading institutes of the ministry, such as the Scientific Research
 Automobile-Engine Institute (NAMI), the Institute of Automobile and Tractor
 Technology (Orgavtoprom), and the Institute for Industrial Application of High-
 Frequency Currents (NIITVCh), in cooperation with automobile and tractor plants,
 have developed and introduced into production a number of new machine designs
 and technological processes which provide for considerable conservation of
 material and fuel resources.

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Consequently, in 1952 the Ural Automobile Plant imeni Stalin initiated the production of new automobiles, URALZIS-352, with an improved gas-generating installation, NAMI-G78A, operating on moist wood fuel. The weight of this installation is 100 kg lower than that of the installation used earlier in the generator-gas automobiles ZIS-21. Later, new gas generators are intended to be used also in KT-12 skidding tractors.

In 1952, stationary-type gas-generating installations, NAMI-G78D, working on wood-cutting wastes, were tested with good results in the lumber industry. These gas generators will be used to supply gas for the engines of traveling electric stations of the PES-12 type, now operating on gasoline. This will save up to 30 tons of gasoline per year for each station.

Since 1949, the Moscow Automobile Plant imeni Stalin and the Gor'kiy Automobile Plant imeni Molotov, have been producing ZIS-156 and GAZ-51B automobiles, working on compressed gas, with gas cylinders of NAMI design, thus permitting the conservation of liquid fuel and the utilization of local types of fuels.

A number of successful works have been conducted also for the purpose of the economical use of ferrous and nonferrous metals. Despite all these efforts, institutes must develop considerably greater activity in the field of materials conservation.

According to the plan for 1953, numerous works on this subject are to be conducted at institutes of the automobile and tractor industry. Some of the essential projects are as follows: development of designs for generator-gas automobiles and tractors which use brown coals and peat briquettes as fuel; testing experimental models of steam automobiles and tractors; increasing the efficiency of the D-35 tractor diesel engine, designing a highly economical diesel engine for heavy-duty trucks; developing the theory of dynamics and fuel economy for automobiles, etc.

A significant part of the activity of institutes in 1953 will be devoted to design works for the purpose of reducing the weight of machines and the consumption of metals.

Thus, the Scientific Research Autotractor Institute (NATI) will continue the development of suspension systems for wheeled and caterpillar tractors which would permit using suspended instead of trailer-type agricultural implements. At present, suspension systems are made only for Universal-2 and KMTZ-7 wheeled tractors. The use of a suspension system with Universal-2 tractors gives a saving of ferrous metals in the amount of one ton per set of agricultural implements for this type of tractor.

Intensive works are planned in 1953 for developing new, more efficient technological processes which would provide for a considerable saving of metals.

For example, NAMI, NATI, and Orgavtoprom, jointly with automobile and tractor plants, will continue experimental works in the field of casting automobile and tractor parts out of high-strength cast iron treated with magnesium. The application of high-strength cast iron for such parts as crankshafts, rear axle housings, wheel hubs, and spring brackets will result in a considerable saving of rolled stock and electric power, the latter being used additionally in the production of malleable iron.

Orgavtoprom is working with autotractor plants on the development of a new technological process for semipermanent mold casting. Industrial application of this process will reduce the consumption of liquid metal by one third and the amount of molding sand by five sixths, decreasing labor consumption by half.

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A considerable space in the working schedule of institutes will be given to the projects of searching for new non-scarce materials and to decreasing the consumption of nonferrous metals.

NAMI and NATI are planning to complete industrial adaptation of all-steel tractor radiators and automobile radiators with steel cooling fins. As a result of this measure, the following saving of metal will be achieved: 15-20 kg of brass and 2-3 kg of tin-lead solder on each tractor radiator, and about 5 kg of brass on each automobile radiator.

Great economic significance is attached to the work conducted by NAMI in cooperation with the Gor'kiy Automobile Plant imeni Molotov on development of a new alloy, containing no nickel or copper, for casting the liners of engine cylinders. No less important is the work of NATI on replacing the lead-bronze bearings in tractor diesel engines with aluminum liners on steel backings. Completion of these two projects will permit a saving of thousands of tons of ferrous and nonferrous metals.

Works of Orgavtoprom in developing an oilless binder have found wide application in the automobile and tractor industry. In 1952, utilization of 4,000 tons of this binder in the foundry industry resulted in a saving of 1,200 tons of oil and 600 tons of rosin. This work will be continued further in 1953.

An essential work in the field of conservation of nonferrous metals will be conducted at appropriate scientific research organizations of the bearing and instrument-building industry. For example, the Experimental Scientific Research Institute of the Bearing Industry (ENIIPP) is now working on the problem of finding substitutes for nonferrous metals used in manufacturing the cages of rolling bearings. In the future, these parts are supposed to be made of steel with various additions and of cast iron treated with magnesium.

The Scientific Research Institute of Automobile Equipment, Carburetors, and Instruments (NIIAvtopribor) is now completing, jointly with the "Krasnyy Oktyabr'" plant, development of a process for aluminum coating of headlight reflectors instead of chromium-silver plating. The automatic installation for aluminizing will be designed in 1953. The same institute, jointly with the ATE-1 plant, is working on industrial adaptation of smaller 12-v relays for Pobeda, ZIM, GAZ-51, ZIS-150, and other automobiles. Upon completion of this project, the weight of each relay will be reduced from 3.6 to 1.6 kg, whereas the consumption of ferrous and nonferrous metals for each relay will be decreased by 0.6 and 0.8 kg respectively.

In the current year the volume of works on subjects involved in the conservation of material resources will be considerably increased. The majority of the subjects in institute plans for 1953 are connected to some extent with problems of conservation.

The main shortcoming in the solution of the problem of materials conservation is that frequently numerous works of scientific research organizations are improperly introduced into industry, and therefore do not give the expected effect. Thus, the method of investment casting, developed by Orgavtoprom, is still insufficiently used at such mass-production plants as the Moscow Automobile Plant imeni Stalin, the Gor'kiy Automobile Plant imeni Molotov, and others. The method of plastic upsetting of springs, worked out at NAMI, is also not in use on a proper scale. This is partially due to a lack of contact with industry in the process of developing a new method for strengthening springs. As a result, the method has not been developed sufficiently for practical purposes.

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Frequently, institutes delay the completion of scientific research works, transferring them from the current to the next year's plan. Among these delayed works are such projects as the design of a highly economical gasoline engine and a generator-gas automobile equal in dynamic qualities to a gasoline car (NAMI), and also the design of a wear-resistant track for DT-54 tractor (NATI). NIITVCh is lagging in solving the problems of high-frequency induction hardening of gears of large and medium modules. The works of Orgavtoprom and ENIIPP for the automation of technological processes are inadequate.

A decided improvement in the activity of institutes of the automobile and tractor industry is expected in 1953.

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